

DOE SECRETARY OF ENERGY John Herrington (right) visited Sandia for the first time last week. Here, Pace VanDevender, director of Pulsed Power Sciences 1200, discusses a model of PBFA II with Herrington, Rep. Manuel Lujan, Sen. Pete Domenici, and President George Dacey.



PRESS CONFERENCE and a briefing preceded Secretary Herrington's tour of Area IV. Here, Rep. Lujan, Herrington, and Sen. Domenici respond to reporters' questions. The Secretary was accompanied on his visit by his press secretary, Dave Devane, and by Ted Garrish, Assistant Secretary for Congressional, Intergovernmental, and Public Affairs.

# **LAB NEWS**

VOL. 37 NO. 16      SANDIA NATIONAL LABORATORIES      AUGUST 16, 1985

## ***Building Better Boxes***

# **SANDAC: Smarter and Smarter**

The challenge in building embedded computers has always been to process more data through smaller boxes in less time. SANDAC — *Sandia Airborne Computer* — does this job better than any other member of Sandia's embedded — that is, included in something that doesn't do computing as its main function — computer family. It's a wiry little guy.

The current version, SANDAC IV, weighs 20 pounds, fits comfortably in a shoebox, and, for the problems it's tailored to solve, packs the computational power of a desk-sized computer. It could someday be the brains of a wide range of so-called "smart" weapon systems. SANDAC V, about five times more powerful than SANDAC IV, is now being tested.

"SANDAC IV puts navigation and guidance capabilities into reentry vehicles," says Ed Barsis, manager of Electronic Subsystems Department II 2330. "Sandia has designed embedded computers for that purpose since the 1970s. But SANDAC IV is different. Its immense power and diminutive size make it useful for conventional weapons too."

SANDAC processes data at extraordinary speeds. This capability and its compact size make it a natural for embedding in, for example, sophisticated helicopters to help pilots control increasingly complex guidance and weapons functions — even in the less-than-a-split-second reaction times required in combat situations.

The first SANDACs were designed to solve specific navigational problems. Over seven years and several generations of development, members of the SANDAC family have carried out computations necessary for automatic pilots and terrain-aided guidance. And the Army is using a SANDAC IV in prototypes of new helicop-

*(Continued on Page Four)*



GOOD PHOTOS of an eagle bringing food to its young are rare. This one might have been the definitive eagle photo, but the mother eagle turned aside at the last second, so we can't see the rabbit she's carrying to her four-week-old youngsters. Dan True, an expert on eagles, took the photo (see story, Page Four).

# Antojitos

So You Want to Get Promoted While proofreading another "Supervisory Appointments" column the other day, I asked myself, "Does no one ever list TV watching as a hobby?" The answer, courtesy summer hire Sharon Ball, is "no one." Her survey of the columns for a year revealed that the hobbies most often mentioned by new supervisors are skiing, fishing, and playing any kind of ball. These macho/macha sports are followed closely by other outdoorsy activities: hunting, camping, jogging, hiking, and photography. In one issue, every promotee was interested in woodworking.

Way down the list of hobbies (one mention each) are anthropology, bird watching, playing chess or Go, china painting, cooking, mathematics, attending movies, petrology, raising horses, restoring old cars, sailplane racing, scuba diving, walking, weightlifting, and wind surfing.

And those who admit to being involved in any sedentary activity, like reading or sewing, are quick to note that they also love to jog, hike, camp, etc.

\* But no one watches TV. Is it Sandia policy to promote only the tubeless? Is it that no one dares admit to watching? Or is it that TV has become elemental, like eating, sleeping, brushing your teeth, so no one even thinks of mentioning it. (Somebody out there is watching TV -- the national average is six or seven hours a day.)

My boss notes that Dr. Jack Copeland, the surgeon who did the heart transplant in Tucson last March, said on The MacNeill-Lehrer Newshour (yes, my boss watches TV, but only the intellectual programs -- both of them) that the Copelands' hobbies are skiing, going to the theatre, and "we watch a lot of TV out here." Of course, that's Arizona; he'd never make section at Sandia.

\* \* \*

Headline on a LANL Press Release: SEVEN LAB EMPLOYEES WIN WOMEN AT WORK AWARDS. Guess it's a good thing I don't work at Los Alamos -- if I won one, as a "work award" or as any other kind of performance incentive, I doubt my wife would let me keep her.

\* \* \*

The Signs Above the Water Coolers First of all, it's a bit embarrassing to have to be told "THIS IS A WATER FOUNTAIN." (I know; that's why I'm drinking here.) The signs go on to proscribe a variety of unsociable acts, like "emptying other liquids" down their little drains. Maybe the signs are necessary, but couldn't we spell "fountain" right? ●BH

\* \* \*

Agua que no has de beber, déjala correr. (Water that you will not drink, let it run. Or "Don't meddle in others' affairs.")

## Events Calendar

Aug. 17 — Summerfest: Native American Festival — dances, pottery, music, etc., 5-10 p.m., Civic Plaza.

Aug. 17 — "The Ecology of a Sub-Alpine Meadow," a three-mile hike led by Terry Dunbar (APS) from Summit House to observe wildflowers in the Sandias, NM Museum of Natural History; \$15, limited to 20 participants, 841-8836.

Aug. 17-18 — 64th Annual Indian Market, 600 Southwest Indian artists and craftspeople — exhibits, demonstrations, sales; Indian dances at 2 & 4 p.m.; on the Plaza, Santa Fe.

Aug. 17-18 — Annual Zuni Tribal Fair: arts and crafts, food booths, contests; Zuni Pueblo, 782-4481.

Aug. 18 — Albuquerque Municipal Band concert, 1-2 p.m., Old Town Plaza, free, 842-0949.

Aug. 23 — Chamber Orchestra of Albuquerque concert, music by Rachmaninoff, Chopin, and Dvorak; 8:15 p.m., Little Theatre, 247-0262.

Aug. 24-25 — Feria Artesana: a celebration of Hispanic heritage with arts and crafts, entertainment, outdoor folk mass; Convention Center, 766-7660.

Aug. 23-25, 30-31, Sept. 1, 6-7 — Albuquerque Civic Light Opera, "Bye Bye Birdie," Fri. & Sat. 8:15 p.m., Sun. 2:15 p.m., Popejoy, 345-6577.

Through Aug. 27 — Intermountain Weavers Exhibition: artists from nine-state region exhibit fine weaving and textile design. Lower level, Main Library, downtown.

Through Aug. 31 — "Baby With the Bathwater," The Vortex Theatre, performances Fri., Sat., & Sun., 247-8600.

## LAB NEWS

Published Fortnightly on Fridays

### SANDIA NATIONAL LABORATORIES

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ED HARLEY (6227) smiles with the word that his poster presentation, "Long-Term Performance Evaluation of Six Intermediate-Temperature Industrial Process Heat Systems," was judged third in a competition among more than 1000 entries in the recent Intersol '85 conference of the International Solar Energy Society held in Montreal. Ed's display and accompanying tech paper described a DOE project to measure and monitor performance of solar industrial heat process systems. All papers at the conference were presented as poster displays with opportunities for authors to interact with interested attendees. "A very effective method," Ed says. Co-author of the paper was William Stine, California State Polytechnic University, Pomona.

# Sandia, Spain Cooperate In Central Receiver Study

Sandia Livermore and Spain will cooperate in a three-year study of solar central receivers. The U.S./Spanish Joint Committee for Scientific and Technological Cooperation selected Sandia as the U.S. member of the team.

"Spain's approval of this study indicates that country's renewed interest in developing solar thermal technology," says Al Skinrood, supervisor of Solar Central Receiver Systems Division 8471 and principal Sandia investigator for the study.

Beginning in 1978, Sandia provided technical assistance to Spain in the design and construction of an experimental central receiver plant, CESA-1, at Almeria. That test program, part of the Treaty of Friendship and Cooperation, was successfully completed in December 1984.

The aim of the new study is not to build a new plant but to use data from CESA-1 and from Solar One, the 10 MWe pilot plant in Barstow, Calif., to assess the economic value and technical performance of central receiver plants in general.

"We are very pleased that this study has been funded because it will keep the lines of communication open to the Spanish solar program and allow us to exchange experimental data," says Al, who led the SNLL team on the Solar One project. "The study activities will be a valuable supplement to ongoing U.S. work."

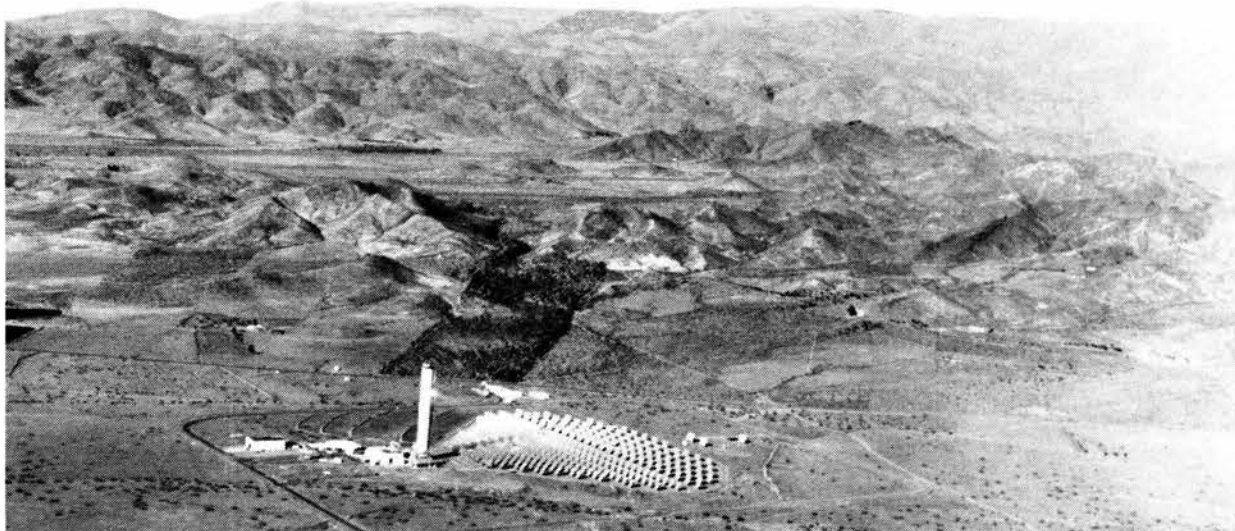
In solar central receiver technology, sun-tracking mirrors, or heliostats, reflect sunlight onto a boiler mounted on top of a high tower. This sunlight heats a working fluid, which drives a generator to produce electricity or provides process heat. There are many design variables in central receiver technology — working fluid, storage medium, and shape of receiver (external or cavity). Because altering any one of these variables means drastic design changes to the system, many experiments are necessary to define optimum operating conditions.

Cooperative analysis of the data from CESA-1 and Solar One should help to define the most important characteristics of an efficient central receiver plant. The study will also examine ways to increase productivity so that solar receiver technology can someday compete economically with nuclear and fossil fuels.

Under the agreement, Spain and the U.S. will share information from the two plants. CESA-1 uses a cavity-type receiver surrounded by 300 heliostats. Water/steam is the working fluid for the receiver, and a mixture of molten nitrate salts is the fluid for the thermal storage system. Solar One uses an external-type receiver surrounded by 1818 heliostats. Again, water/steam is the working fluid, but a high-temperature thermal oil is used in the thermal storage system.

"Exchanging information with other countries is especially important now in view of the declining U.S. budget for solar energy research and development," Al adds. "The United States must depend on system experiments from other countries to test such variables as receiver design and thermal storage fluid."

• Michael Alley, 8265



EXPERIMENTAL SOLAR Central Receiver plant near Almeria, Spain.



## SANDIA LIVERMORE NEWS

VOL. 37 NO. 16

SANDIA NATIONAL LABORATORIES

AUGUST 16, 1985



SANDIA MANAGEMENT set an example for other employees by donning "trashbusters" T-shirts and grabbing brooms to publicize the upcoming Labs-wide clean-up effort scheduled for Friday afternoon, Aug. 23. A half day is being set aside by Vice-President Dick Claassen to clear out unwanted equipment, supplies, and files, and generally to clean up the site. Extra help will then be called in to pick up the discards over that weekend. Shown cleaning up the loading dock area east of Bldg. 912 are (from left): Rick Wayne (8400), Trashbuster committee chairperson Bonnie Spencer (8262), Dick Claassen, Dan Hartley (8300), Del Olson (8100), and Arlyn Blackwell (8200).

### Congratulations

Deborah and Ken (8184) St. Hilaire (8184), a son, Nicholas Lee, May 31.

### Sympathy

To Don Benton (8181) on the death of his mother in Livermore, July 17.

To Sallie Fadda (8022) on the death of her father in Castro Valley, July 28.

To Barry Formisano (8445) on the death of his grandmother in Cromwell, Conn., June 19.

## SANDAC

tors to evaluate advanced avionics concepts.

"The secret to SANDAC's success was that we developed a way to make many microprocessor chips work simultaneously while using little power and occupying a small volume," says Paul Pierce of Guidance and Control Division II 2336. Paul, project leader on the SANDAC team, led the hardware design.

"This parallel processing gives SANDAC the power of many individual computers condensed in a single unit," says Charlie Blaine, 2336 supervisor. "The most basic configuration consists of three circuit boards — a central processing unit [CPU] board, a system input/output board, and a power supply board. These boards form a complete computer. They are also the expandable kernel of SANDAC's parallel processing architecture."

"In a typical three-processor configuration, SANDAC has the computing power of DEC's VAX780 computer — it processes 1.5 million instructions per second," says Paul. "A SANDAC IV with that configuration operates at temperatures up to 190°F, withstands the vibration and acceleration of military weapon applications, consumes only about 20 watts of power, and is small enough and light enough to be held in one hand." With its maximum of 16 processor boards running in parallel, SANDAC IV is capable of executing eight million instructions per second.

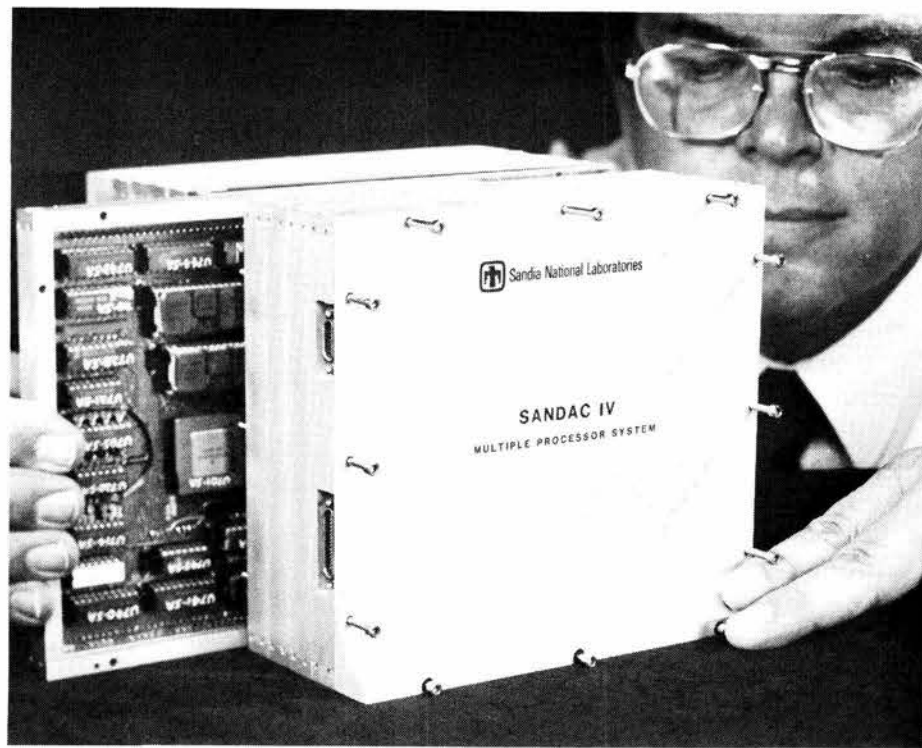
SANDAC IV allows as many as 15 microprocessor boards to be added to the three boards in the SANDAC kernel. Each board carries with it a portion of the computer's outside case and plugs into the boards adjacent to it (see photo). This hardware design eliminates the need for separate connection boards and decreases the unit's weight and volume.

SANDAC IV contains off-the-shelf microelectronic components — its processor boards use Motorola's MC68000 microprocessor — which allows for low cost and quick turn-around in design. For use in radiation environments, the design could be made radiation-tolerant by using specially designed chips from the Center for Radiation-Hardened Microelectronics.

The trick is to write software that instructs the individual microcomputer chips to work in harmony — each chip must operate at maximum capacity without interfering with or delaying any other chip.

"We're testing SANDAC V now," says Chuck Borgman who, along with Jim Kobs (both 2336), wrote much of the software for SANDAC's initial applications. "It will use a next-generation microprocessor. Initial results show that, with the newer chip, SANDAC V will achieve about 40 million instructions per second. That's roughly equal to the throughput of a CRAY-1 supercomputer."

More than 20 Sandians are involved now in some aspect of the SANDAC project. But Charlie, Paul, Chuck, and Jim — as well as Steve Reynolds (2336) — have worked continuously on the project over the years of its development. They've been pleased to prove the adage true — good things come in small packages.



STEVE REYNOLDS (2336) pulls a microprocessor board from a SANDAC IV with an 11-stack configuration. SANDAC IV's stack design can be tailored to fit application needs with up to 16 microprocessor boards per unit. Each microprocessor board can handle 500,000 instructions per second. With five microprocessor boards, the SANDAC IV pictured can process up to 2.5 million instructions per second — more than many mainframe computers. Note the small size of the box: given Steve's fingers as a rule, it's about eight fingers cubed — not much more than a handful!

### True Grit

## Photographing Eagles Takes Preparation, Patience, & Luck

We call parts of Coyote Test Complex "remote areas." That's because they are. And "remote" means ideal for wildlife as well as for experiments.

With the cooperation of Sandia and KAFB security, eagle expert Dan True has spent a good deal of his time over the last few years observing and photographing a pair of golden eagles as they raise families in one of three nests, or aeries, in the Manzanos. Dan set up a camera and a blind overlooking the aerie, some 60 feet up a cliff, that the pair is using this year.

"Preparation, patience, and luck," says Dan, when asked the secret of photographing eagles. With two decades of experience and two books, *Family of Eagles* and *Flying Free*, to his credit, he knows eagles.

"The male of this pair is the prettiest I've ever seen," he notes. "And both male and female are excellent providers for their two eaglets. I watched the babies, a male and a female [females are some 20 percent larger], every afternoon for 10 weeks, from hatching to first flight."

And the eaglets were fed well: snowshoe rabbits accounted for about half their diet; the rest was rabbits (both cottontail and jackrabbit), rock squirrels, and a few roadrunners, ducks, and quail. The birds are "targets of opportunity," for the adults, says Dan.

"Although golden eagles are not massive birds [females are 20 to 22 inches tall and have a wingspan of 7½ feet], they're strong enough to kill their prey by constriction —

they simply squeeze the life out of it — before bringing it back to the nest. It's a clean operation — no puncture marks anywhere on the body." (The exception is jackrabbits; they're too heavy to carry, so the eagles cut them in half with their beaks.)

"One thing I learned this year is that the eagles understand the 'waste not, want not' concept," says Dan. "One afternoon the mother brought in a rabbit, but the babies were too full to be fed at the moment, so she simply left it lying on the nest. Some three hours later, the father brought in a fresh rabbit. I would have predicted that he'd feed the now-hungry babies the fresh rabbit. But he didn't. He somehow recognized that the first rabbit wouldn't keep as long as the second, so that's the one he fed the babies.

"I guess that's the kind of insight that keeps me out watching eagles," Dan continues. "I admire the control they have over their lives — and their adaptability. They're magnificent creatures."



Are you a member of a non-profit organization and also interested in serving on its board of directors? From time to time Volunteers In Action receives requests from agencies for board members from Sandia. It is helpful for us to know those Sandians (both on-roll and retired) who may already be members of (or significantly interested in) a particular group. Frequently, their experience and knowledge could contribute toward skills as a board member. If you have a particular interest in an agency, please call Karen Shane (4-3268).

### Congratulations

James Walkup (322) and Linda Brannon married in Kirkwood, Mo., Aug. 3.

Robert (7132) and Barbara Parson, a daughter, Tamara Lynn, June 24.

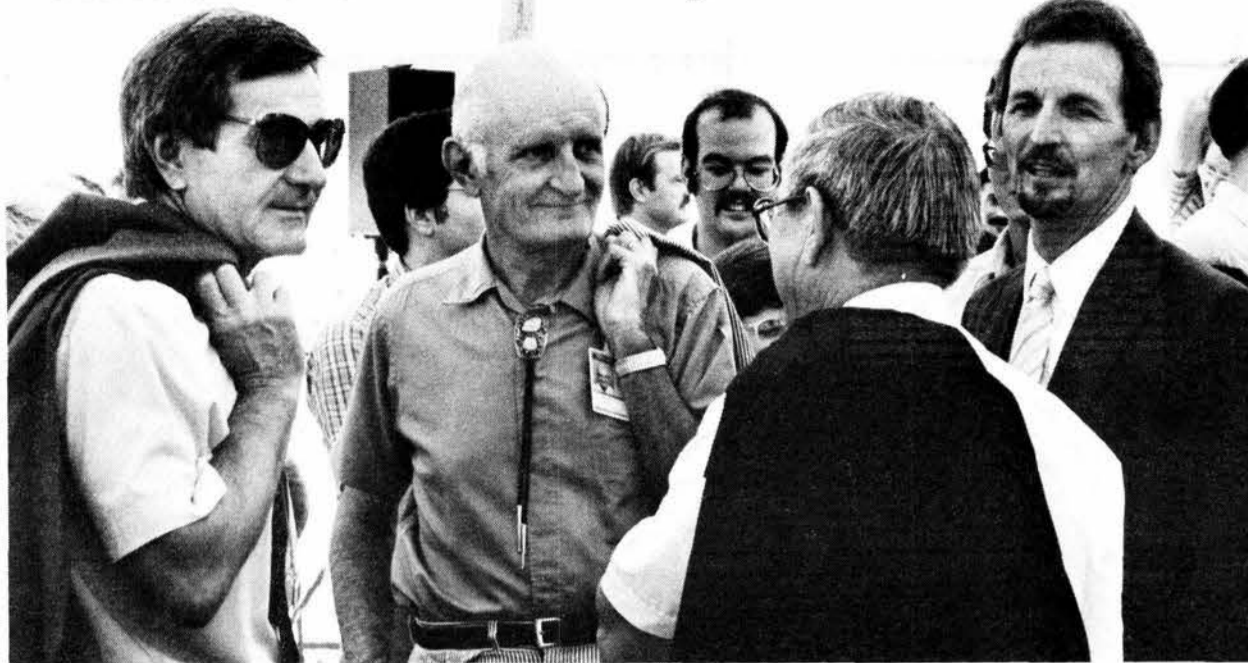
David (7474) and Mary Sparks, a son, Steven David, July 8.

Phil (7474) and Maxine Gallegos, a son, Gregory Ramon, July 11.

Gilbert (7474) and Lupe Polaco, a daughter, Victoria, July 22.

Mike (5211) and Jane Moulton, a son, Jeffrey James, July 31.

## RHIC Lab Ceremony . . .



REP. MANUEL LUJAN (foreground) chats with (from left) Ray Romatowski, manager of DOE's Albuquerque Operations Office; Morgan Sparks, former Sandia president, who played a key role in planning Sandia's successful microelectronics program; and Bob Gregory, director of Microelectronics 2100.



FOLLOWING THE RHIC LAB CEREMONY, at which he and other dignitaries spoke, Sen. Pete Domenici was interviewed by several local reporters. Accompanying Domenici was Paul Gilman, his administrative assistant.



REP. MANUEL LUJAN at the RHIC Lab start-up ceremony with Ellen Lemen. She and Don Davis (both 2148) modeled the protective clothing ("bunny suits") that will be used in the new Lab to ensure the highest attainable level of cleanliness during prototype IC fabrication (LAB NEWS, Feb. 15, 1985).



BILL HOOVER, DOE's Assistant Secretary for Defense Programs, chats with Col. Charles Thomas, KAFB Base Commander, after the RHIC Lab ceremony.

## RADLAC II Produces First High-Energy Beam

RADLAC II, a powerful accelerator built to evaluate the feasibility of using very-high-current electron beams in potential weapon applications, has produced its first beam. It is now regularly producing electron beams in a small test chamber attached to the accelerator.

The initial "beam extraction" was a milestone in a joint program involving Sandia, AFWL (Air Force Weapons Laboratory), and DARPA (Defense Advanced Research Projects Agency). The program addresses key issues in research of potential directed-energy weapons using electron beams. These efforts would complement other defensive technologies.

The RADLAC program's goal is to develop high-current, high-energy, linear electron accelerator technology to investigate the physics of producing and propagating potentially lethal beams of electrons.

One goal of the research is to investigate the propagation of an electron beam in full-density air. A key technical challenge is to keep the beam stable.

In early experimental studies of beam propagation, the beam enters a test chamber in which thin plastic detectors have been inserted along the beam path.

They indicate the width and accuracy of the beam.

RADLAC II was developed over the past two years. Its predecessor, RADLAC I — now disassembled — began operation in 1980 and produced up to 25 kiloamps. In late 1984, RADLAC II became operational at the 40 to 50 kiloamp level, making it the most powerful induction linear accelerator in the country.

By comparison, sophisticated linear accelerators used for basic research into fundamental properties of matter produce very high energies but very small currents. For example, the two-mile-long accelerator at the Stanford Linear Accelerator Center (SLAC) produces electron beams with currents of thousandths of an amp; current from RADLAC II is several orders of magnitude greater.

RADLAC II uses modular, pulsed transmission lines to increase the energy of an electron beam in steps of two or three million electron-volts (MeV) until it has very high energy. The process is similar to that used in Sandia's particle beam fusion program except that voltage from the multiple modules is added in series.

RADLAC II is an induction accelerator — it accelerates electrons by using the induc-

tive electric field produced by a time-varying magnetic field. Laser-triggered switches synchronize the timing so that the electrons are given a series of pushes at just the right times and locations. Because induction accelerators have inherently low impedance — opposition to the flow of an alternating current — they can drive high-current beams.

The RADLAC approach is theoretically capable of accelerating very high beam currents with good efficiency.

But before that potential can be realized, a number of important technical issues associated with the physics of propagating a high-current electron beam through the atmosphere must be resolved:

- A single beam pulse must propagate without growth in instability.
- Subsequent pulses must follow and propagate stably in the channel created by earlier pulses in the train.
- And energies sufficient to destroy a target must be delivered over militarily significant distances.

Other Sandians involved with RADLAC II include Dave Johnson and Dave Smith, both of Pulse Power Development Division 1245, and Mike Mazarakis of High-Energy Beam Physics Division 1272.

## China's Oldest & Newest Fascinate Tech Librarian

China in transition sounds like a book or TV documentary title. But that's the impression Linda Erickson (3144) came home with after a three-week trip to China this spring.

She was a member of a library and information science delegation invited to visit the People's Republic of China by the China Society of Library Science. The Society's aim was to further Chinese knowledge of library automation, cooperation and networking, conservation of materials, library education, and library management.

The tour was cosponsored by CAST (China Association for Science and Technology) and coordinated by the Citizen Ambassador Program of People to People International, a non-political organization that promotes international understanding through technical exchanges between delegates and their professional counterparts in foreign countries. The former group provided guides who traveled with the group until they left the country.

"Our guides were young, bright, curious, and articulate," Linda says. "All were college graduates, and most had excellent command of English."

The group — 62 professionals and five accompanying delegates — traveled together in Beijing for five days, and in Xi'an for two days. Then the delegation split into two parts, with the public librarians leaving for Wuhan, Nanjing, and Guangzhou. Linda's group of academic, special, and school librarians continued to Chengdu for six days and to Shanghai for two days. The entire group reconvened in Hong Kong for two days before returning to the U.S.

All members of the group had been asked to prepare presentations on a variety of library topics. Linda's paper, "Technological Tools for the Library," was well received.

"One of the best meetings I attended was in Beijing with librarians from the Chinese Academy of Sciences," she recalls. "Most of the papers they requested were on automation or on preservation of materials. We were all prepared to deliver our papers through an interpreter but were surprised when we were told that everyone in the audience spoke English and that we should read our papers in English — slowly."

"Our meeting was held in the Cultural Palace of Nationalities, and at the end, we were offered a tour of the building. Our hosts brought out some of their ancient and rare Tibetan *sutras* for us to see and hold." (The Buddhist *sutra* denotes a doctrinal work, sometimes of considerable length, in which a particular point of doctrine is pro-pounded and deliberated.)

"The Beijing National Library, comparable to our Library of Congress, has about 12 million books and a staff of 1200. About 50 percent of their books are in Chinese. We were given a tour of their 'computer center.' It was a small room with a Japanese computer (one disk drive and three or four input terminals). One of the terminals was for inputting Chinese characters with a light pen system. They do have plans for an integrated computer system for their new

building, which is under construction. The critical problem for library automation is the ability — or inability — of computers to process Chinese characters. Cataloging and computerization of foreign language materials is not a problem, but dealing with Chinese characters is very difficult.

"In Xi'an we visited the Provincial Library, which is the only public library in a province of about four million people. The stacks are closed, and people have to reserve a seat in a reading room. We were invited to their rare books area and were shown some books as old as 700 years. These rare books were stored in wooden cases with glass fronts, with no climate control."

Other visits included medical and military medical libraries where informal question-and-answer discussions followed the presentation of American papers.

"In all cities, we had two or three choices of places we could elect to visit each day, depending on our particular library interests," Linda says. In Chengdu, the capital of Sichuan Province (more than 2000 miles inland), Linda visited the Library of Chengdu Institute of Radio Engineering

(CIRE) and the Sichuan University Library. She also participated in several meetings with academic librarians and information science people. "In all the meetings, the Chinese expressed interest in automating their libraries, but they have a long way to go."

"The Shanghai Public Library is an interesting facility. It's housed in a building that was the clubhouse for the race course. It seems to be one of the few major libraries that was not pillaged during the Cultural Revolution. Even though it was closed for three years, the collection was preserved intact. Some of the people I talked to admitted that many libraries were pillaged and many books were burned." Linda also visited the library at Shanghai Jiao Tong University, called the "eastern MIT."

The three-week visit was not limited to library visits and discussions. "Our schedule was packed from daylight to dark," Linda says. "Our hosts filled the after-hours time with cultural events, banquets, shopping, and sightseeing. It was an exhausting schedule, but for me it was a change of a lifetime and was well worth the money and using 16 days of vacation."



THE READING ROOM at the Shanghai Public Library (former racetrack clubhouse) has 1300 seats and is visited by 3000-4000 people daily. Most public libraries in China have closed stacks, and users must reserve seats in the reading rooms.

### Some Impressions

## Erickson on China

Very structured society — can't change arrangements at last minute. Informal talks were wonderful — in formal situations, Chinese are generally reluctant to ask questions; there's a definite protocol to be followed between professionals.

We were all surprised at how much English is spoken and understood; yet only the top one percent of students can go on to college.

Our hosts arranged a weekend trip to the mountains outside of Chengdu. We traveled by bus, and I felt as if I had gone through a time warp as we passed through the country — rice paddies, water buffalo, total lack of modern equipment, road building and construction all by hand.

The food was wonderful — pork, duck, fish, chicken, and always lots of fresh

vegetables; no water, just soda pop or warm beer or tea; no dessert — soup is served as the last course "to clear the palate." At the banquets, protocol is as important as eating.

Unforgettable visits to the Forbidden City, the Ming Tombs and the Avenue of the Animals in Beijing; the jade carving factory, the excavation pits near Mausoleum of Qin Shi Huang to see the terra-cotta warriors and horses, and the Tang Dynasty music and dance show with such spectacular costumes, all in Xi'an. The Chengdu Zoo to see the pandas, the Shuxiu Embroidery factory, and the weekend visit to Mt. Emei — Leshan Giant Buddah, Wannian Temple, and lunch at the Myriad Years Monastery. And, of course, the more common tourist sites in Shanghai and Hong Kong.

## 'Let's Not Let This Happen Again!'



LINDA ERICKSON (3144) at the harbor in Shanghai.



AT THE Chengdu Institute of Radio Engineering microcomputer lab, Linda was struck by the contrast between "high tech" and the "Mao" suit. The computer, made in China, carries the "Great Wall" brand name.



RARE TIBETAN sutras at the Cultural Palace of Nationalities in Beijing. The "pages" of the books are thin sheets of wood, and colorful designs are painted on the edges.



AT THE XI'AN Provincial Library, the group was allowed to see the rare books collection, including these 700-year-old books. Most of the libraries have similar collections — books, maps, scrolls. Linda examined a 1000-year-old scroll, printed on bamboo paper, which contains no acid. That may explain why the collections seem so remarkably well preserved, even without the aid of modern climate control systems.

The world observed the 40th anniversary of the atomic bombing of Hiroshima on Aug. 6 — an awesome event that ushered in a totally new concept of warfare. As several special television programs and numerous articles in newspapers and magazines made clear last week, the world is still trying to come to terms with Hiroshima and its legacy.

Harold Agnew, who was quoted extensively in *Time* magazine and featured prominently on a CBS news special hosted by Walter Cronkite, spoke last week to Sandians about the early days of the nuclear age. He was one of the young scientists originally recruited to work in the top secret project and, most dramatically, he witnessed (and filmed) the atomic bombing of Hiroshima.

(Agnew went on to become director of LANL and recently retired as president of General Atomic Technologies, Inc.)

During his address, Agnew described the feelings at the time, the "gnawing fear" of Fermi, Teller, and others that Hitler's scientists would develop an atomic bomb before we could. Themselves refugees from Nazi-occupied Europe, they knew personally many of the German scientists involved in the project and were keenly aware of the advanced nature of their research. "The initial sum allocated by Roosevelt for A-bomb research was \$5000," said Agnew. "And at that time Germany was the world center for nuclear research."

Agnew reminisced about a couple of individuals he worked with in those heady days of the Manhattan Project: Gregory Breit ("the most paranoid individual I ever met"), who wrote the first secrecy rules; and General Groves ("he put it all together but never got the accolades he deserved,

perhaps because he wasn't tall, slim, and handsome — he was roly-poly, looked messy"). Agnew also mentioned Luis Alvarez and Walter Johnson, the only other technical people assigned to fly on the instrument plane accompanying the *Enola Gay*.

Agnew expressed strong opinions about the reasons for using the "special" weapon (as it was referred to in the flight orders for Aug. 6, 1945): "People seem to forget we were trying to win and bring the war to an end. As to the argument that we should have set off a demonstration bomb, it might not have worked. And the other argument that it was just a matter of time until the Japanese surrendered overlooks the fact that we were preparing for an invasion of the Japanese home islands in which we anticipated one million Americans and 10 million Japanese dead.

"And an invasion and prolonged fight on Japanese soil would have given the Russians, who had recently declared war on Japan, a chance to invade Hokkaido. In that event, Tokyo today would be like Berlin. China would be boxed in — a lot of history would have been different.

And to Sandians, Agnew delivered this message: "What you are doing is extremely important. There's been no major war. For the first time in history, the decision-makers who initiate wars run the same risk of dying as the young men who fight wars."

Agnew suggests that future "peace exhibits" show pictures of Pearl Harbor, Hong Kong, Nanking, and Bataan in addition to those of Hiroshima to show how the war began and why it ended as it did. And a sign at the end of the exhibit should read, "Let's not let this happen again."

• Carl Mora (400)

## Fun & Games

**Horseshoe Pitching** — The 26th Annual Sandia Labs Horseshoe Pitching Tournament is set for Saturday, Aug. 24, at 6 p.m. at the Los Altos courts. Open to all Sandians, retirees, and families, the tournament requires no entry fee. Refreshments are free. For more details or for an entry form, call Wayne Sly (2854), 6-0562.

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**Golf** — Winners of the recent SGA Lost and Found Tournament played at Cochiti were Dave Salas (2601) and Bill Lutgen (2853), A flight; Steve Valdez (3417) and Helen Gallegos (5255), B flight; Bob Varga (7542) and Frank Sieradzki (2362), C flight; and Joe Bonahoom (5172) and Jerry Letz (7266), D flight.

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**Soccer** — The Sandia Fall Soccer League plays simply for fun — novices and experienced players, men and women participate. Games start in late August and run through October with one, maybe two, games each week after work. All Sandians, DOE employees, contractor people, and adult dependents are welcome. If you are interested, call Mike Edenburn (6433), 4-4003.

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**Tennis** — The Sandia Tennis Association announces a Labor Day tournament to be played on the Coronado Club courts. Cate-

gories include singles for men and women, doubles for men and women, and mixed doubles. Preliminary contests start Friday, Aug. 30, continue through Saturday, and final matches are scheduled Monday, Sept. 2. Prizes will be awarded. Entry deadline is Aug. 27. For an entry blank or more information, call Fred Cericola (7542), tournament chairman, 4-3205.

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**Bicycling** — The East Mountain Bicycle Classic is scheduled Aug. 17-18. Some \$2000 in prizes is offered winners in a number of categories for a race up Sandia Crest and circular loop races for USCF bikers. Sign up at local bike shops or call George Gamble, 242-6833, for an entry form or more information.

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**Women's Golf** — The Sandia Women's Golf Association has held three nine-hole tournaments this summer. At an early UNM North Course tournament, Gretchen Gardner (155) and Eleanor Kelly (ret.) took Flight A and B flight low net honors.

At the Puerto del Sol Course, Lana Lackenmeyer (2420), A flight, and Vicki Black (2561), B flight, were low net winners.

Rosalie Crawford (1), A flight, and Lucy Gray (dependent), B flight, were low net victors at the recent tourney at UNM North.

## Sandia Studies Alter Summer Student's Career

It's a long way from Woodville, Miss. (pop. 1512) to Sandia Labs Albuquerque (pop. 7238). No one knows that better than Tammie Jones (7472). She came from Woodville via Jackson State (Miss.) where she's a junior chemistry major with a full academic scholarship.

One of the few junior participants in Sandia Albuquerque's Summer University Student program, she has made not only a physical journey, but an intellectual one as well.

Back home, she participates in Jackson State's Minority Access to Research Consortium (MARC), a program that requires its participants be involved in actual research projects.

"Last semester we hooked up computers to pH meters, mass spectrometers, and simulated titrators in the chemistry lab," she explains. "That computer hook-up reduces students' time in the lab and makes their data more accurate." Next fall, she will work with the department chairman on another research project.

But Tammie's research work at Sandia has been even more important to her. "Sitting in class, I'd wonder why I needed to learn all that theory. Now I know. I can apply all the theory, and that experience alone is worth my summer here," she says. "But I'm also learning so much more than I did at school."

She works for Mike Lucas (7472) in the plastics lab where she's using epoxy resins to encapsulate electronic parts. He speaks



STICKING TO THE JOB — Working in the plastics lab on a project for Charlie Carter (7472-2), Tammie Jones (7472) bonds stainless steel pins to ferrite caps.

highly of her. "She's intelligent, industrious, and eager to learn new things," he says. She's also working with Robert Martinez (7472) in a chemical bonding project.

And Tammie works for T.A. Allen in Process, Design and Manufacturing Engineering (7484). "She's just number one, as far as I'm concerned," he says. "Tammie is the sharpest of the 20 or so students I've had working for me in the 30 years I've been a supervisor."

Her Sandia experience has, naturally enough, helped focus her career goals. Since she's been working with T.A. on the development of a de-gassing chamber for epoxy resins, she's become especially interested in polymer chemistry. Thanks to that

experience, she now plans to pursue an MS in that field. She also plans to earn a PhD in chemical engineering some day.

The Sandians with whom Tammie works like her, and the feeling is mutual. "People here have been so helpful," she says. "They inspire me to do more and learn more. Even the casual conversations over coffee are intellectually stimulating."

Tammie lives with Paul McKey's (7485) family. "She fits in well with our family," he says. "She's a good kid. Wherever she goes in her career, she'll be an asset."

And she likes Albuquerque. "I'd love to live here," she says. "Albuquerque is a lot like Jackson on a larger scale. I feel really comfortable."

### Sandia's Summer Programs

#### Summertime, & the Learnin' Is Easy

If it seems that you see lots of strange faces around Sandia in the summer, you're right. Actually, there are about 234 strange faces at both Albuquerque and Livermore, and those faces belong to teachers and students working and learning here in various summer hire programs.

**Summer University Faculty** — selects outstanding professors from universities across the nation. The objective is to provide them the opportunity to interact with staff, to make meaningful contributions to Sandia's technical work, and to enhance Sandia-university relations. Participants work primarily in technical departments. There are currently 30 participants in Albuquerque and nine in Livermore.

**Summer High School Faculty** — employs selected junior high (middle school) and high school teachers from throughout New Mexico. The program encourages them to enhance their knowledge and skills through practical work experience related to their educational specialties and through exposure to the Labs' programs and projects. Teachers participating this summer are involved in either of two different programs. One group was recruited through the Career Guidance Institute (CGI) of the Greater Albuquerque Chamber of Commerce and, generally, works in non-technical positions. The other group participates in

the Summer Teacher Enrichment Program (STEP), a program initiated by Sen. Pete Domenici and President Dacey to give science and math teachers an opportunity to upgrade their knowledge of science and technology. There are currently five CGI teachers and 11 STEP teachers.

**Associated Western Universities** — AWU — a consortium of 36 western universities that contract with DOE, which provides money to hire faculty and graduate and undergraduate students to work in energy-related fields. There are currently 13 participants in Albuquerque, 7 in Livermore.

**Summer University Student Program** — provides temporary employment opportunities primarily for university seniors and graduate students. The program provides outstanding students with challenging work assignments, and enhances university relations — including the campus recruiting program (see related story). This year there are 49 participants, 12 at Livermore and 37 at Albuquerque. (Next year, the program will be called the Outstanding Student Summer Program.)

**Undergraduate Fellow Program** — recruits students in engineering, mathematics, physics, chemistry, geoscience, or computer science from UNM, NM State, and NM Tech for summer employment in areas of their particular interest.

Students are usually hired after their freshman year and may work each summer until they complete their undergraduate work. The goal of the program is to attract highly qualified high school students to the participating schools and to allow them to integrate their academic work with related work experience at Sandia. Six students are participating this summer.

**New Mexico State University Summer Drafting Program** — a summer employment program for NMSU students enrolled in the two-year Associate Drafting/Design Program. The objectives are help attract students to NMSU's program and to provide on-the-job experience at Sandia. There are currently two participants.

**Chabot Scholarship Program** — gives two cash scholarships to selected students in science and engineering who are transferring from Chabot, the local college, to a four-year program elsewhere and provides them with jobs at Sandia Livermore. Students are selected by the Chabot faculty.

**Youth Opportunity Trainee (YOT) Program** — provides summer employment to economically disadvantaged high school and post-high school students. Participants are placed in a variety of positions that provide both practical job experience and an opportunity to earn money for school. This summer Albuquerque has 86 YOTs, Livermore, 12.



## Take Note

An all-day "Solar Adobe and Earth Construction" workshop, designed for architects, builders, and owner/builders, will be presented by the NM Solar Energy Institute and the Earth Systems Development Institute on the main campus of Albuquerque T-VI, on Aug. 24. The workshop will feature New Mexico adobe and earth architects, builders, and consultants; and adobe pressed earth block, and rammed earth specialists. Information about registration and fees (\$20) may be obtained by calling 800-432-6782.

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The South Highway 14 Project will no longer sell used books. Between now and the end of September, all used books will be on final sale at 50 percent off the marked price. Bookstands are located in the LAB NEWS office, Bldg. 814. The Project will no longer accept book donations. Thanks to all those who have donated books in the past.

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The 1985 New Mexico DECUS Conference will be held at the Albuquerque Convention Center, Sept. 18-20. Sponsored by Digital Local User Groups of NM, the conference will feature over 50 sessions on VMS, RSX, RT-LL, office automation, and other Digital hardware and software products and services. These sessions, on Sept. 19-20, will be presented by Digital specialists and experts from the user community. Pre-conference seminars will be held Sept. 18. Seminar registration deadline is Sept. 1, and the two-day conference registration is due by Sept. 4. For registration packets and further information, contact Patricia Allen (7523), 4-2634.

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Beginning Saturday, Sept. 7, Seniors Helping Seniors will coordinate a UNM Continuing Education Program that covers major aspects of Social Security, Medicare, and supplemental health insurance. The course will be presented for six consecutive Saturdays from 10 a.m. to 12 noon in the UNM School of Law building, room 2402.

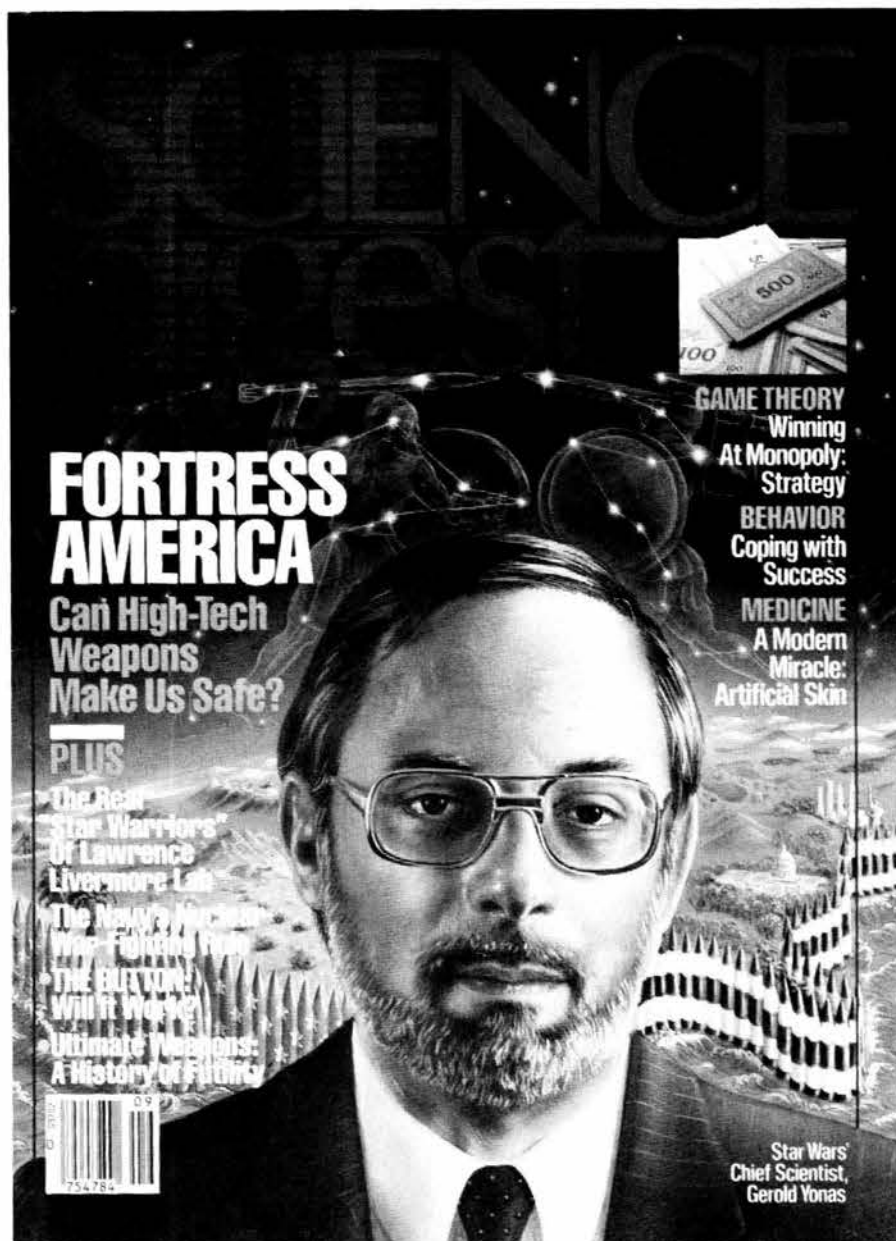
Other topics to be discussed include facts to be considered when making or probating a will and a session on coping with consumer problems. The course is intended for people preparing to retire, young people assisting an older relative or friend, and retirees who need more information about any of these programs.

The only charge will be a \$5 materials fee. For more information, contact the Office of Senior Affairs, 244-2266; to register, contact UNM Continuing Education, 277-6542.

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A Certified Professional Secretary (CPS) Review class will begin at T-VI's main campus on Sept. 4 at 6 p.m. To attain the CPS designation, a secretary must meet certain education and work experience requirements, and pass the two-day, six-part CPS examination, which is administered annually by the Institute for Certifying Secretaries, a department of Professional Secretaries International (PSI). The local exam will be held on May 2-3 at UNM.

The review class, sponsored by the Albuquerque Chapter of PSI, covers two trimes-



ters and includes: accounting, office technology, economics and management, business law, office administration and communication, and behavioral science in business. Cost is \$10 plus \$10 materials fee per trimester. Sandia will reimburse employees for the cost of the review classes and examination fees upon achievement of the CPS rating. For more information, contact Sue Henderson (6420), CPS Chairman on 4-3107, or drop by a CPS Information Session, Aug. 23, 11:30-12:30, Bldg. 823 conference room.

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Get your act together, talented Sandians. The Que Pasa Recreation Center will sponsor a new talent program called "Talent Pursuit" during four Tuesdays in September. All military and civilian personnel and their families are eligible to participate in a variety of categories. Prospective contestants must attend an organizational meeting Aug. 20 where rules and general information about the four "Talent Showdowns" will be discussed and drawings for performance dates will take place. An entry fee of \$25 per category is due at that time. You could win \$500 if your act is selected as best of the show. For more information, call the Que Pasa Recreation Center on 4-5420.

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Necah Furman (3160A), Sandia's corporate historian, recently presented a paper on the origins of the Laboratories at the International Congress of History of Science at UC Berkeley.

The Congress, sponsored by UNESCO and the National Academy of Sciences, attracted some 1000 scientists and historians from around the world. Necah's paper, "Sandia National Laboratories: A Product

of Postwar Readiness," was one of those selected for publication as part of the conference proceedings.

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Classes for the 1985 Rio Grande Zoo Docents (volunteer teachers) start Tuesday, Aug. 20, at 9:30 a.m. in the Zoo Barn. If interested, call Alice Fienning, 298-0743.

### Sympathy

To Gary Reif (2811) on the death of his mother in Norfolk, N.Y., July 30.

To Dolores Sanches-McGlotten (7234) on the recent death of her grandmother.

### Medical Corner

## Volunteers Needed

As mentioned in an earlier column (4/26/85), Allen Adolphe, M.D., a part-time physician in our medical clinic, is conducting a research project on a new type of blood pressure medication. The project is designed to compare the new drug with standard therapy. The study lasts one year, and all medications (the experimental drug and the standard medications) are given to the participants free. All laboratory tests, electrocardiograms, chest X-rays, and two eye exams by an ophthalmologist are free.

If you have high blood pressure and are interested in becoming a participant in this research study, you may call Dr. Adolphe at his office (La Mesa Medical Center) at 883-6565. People with high blood pressure, even if they are already on medication, are possible candidates as long as they are not diabetics, asthmatics, or women still capable of becoming pregnant.

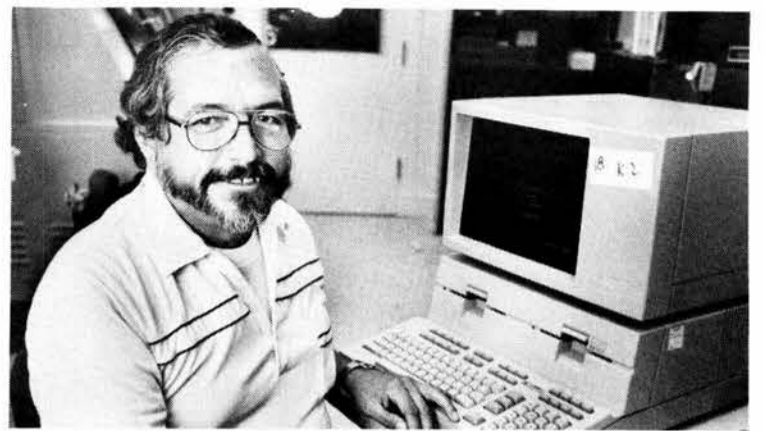
# MILEPOSTS

## LAB NEWS

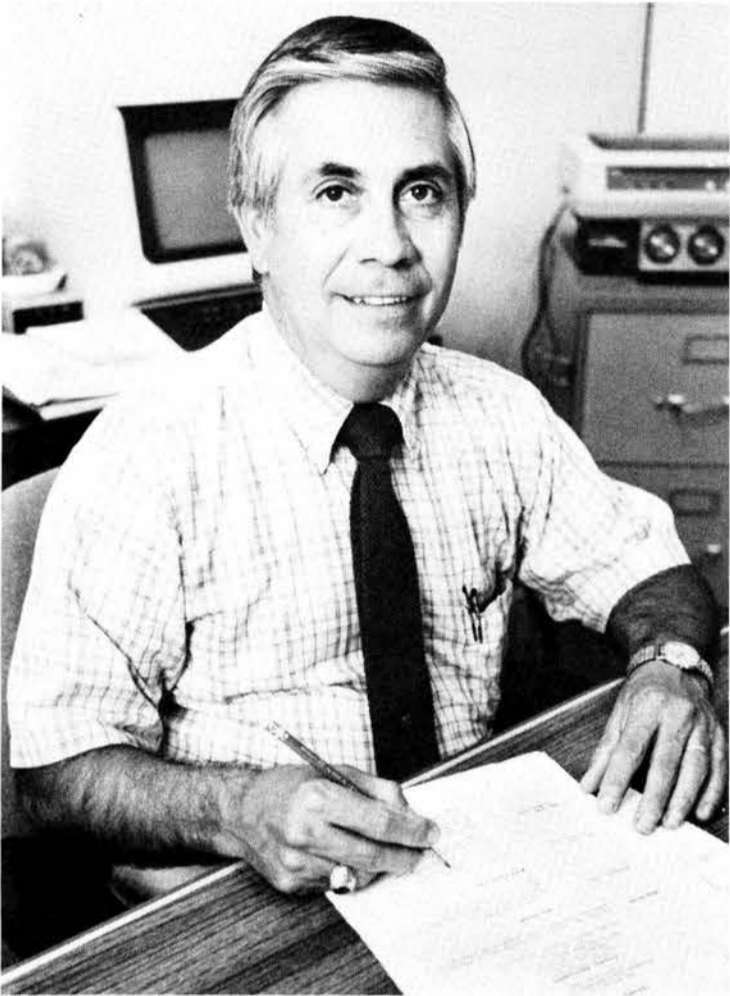
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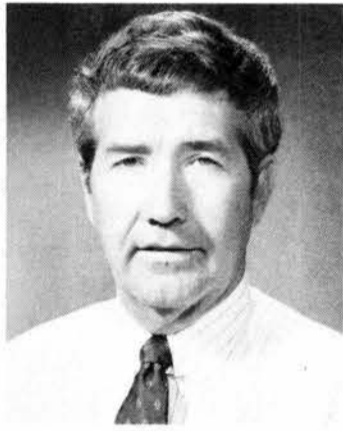
Bob Benham (7531) 20



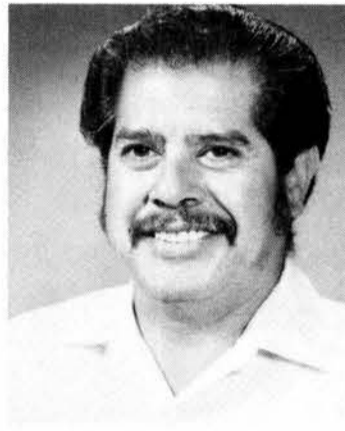
Ernie Montoya (7475) 20



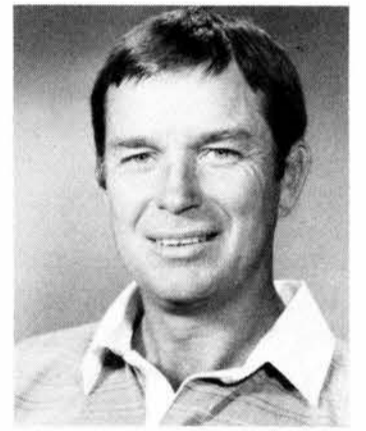
Jake DeVargas (3510) 30



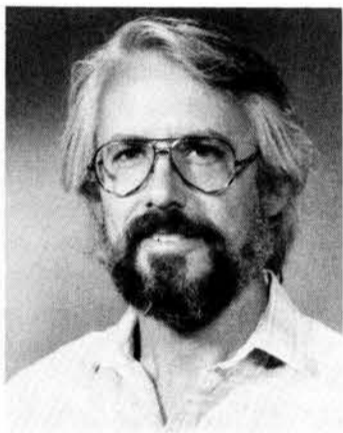
Marv Reichenbach (7484) 25



Fide Molina (7815) 15



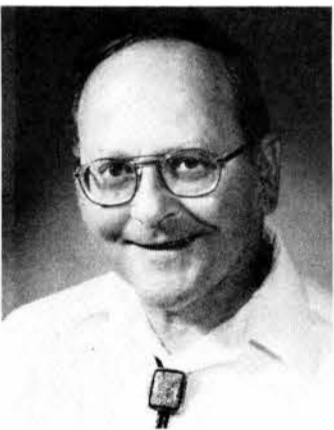
Tom Welch (322) 15



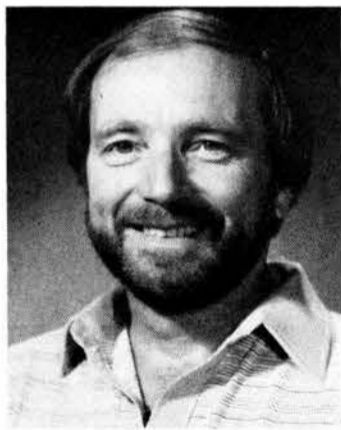
John Olsen (1263) 15



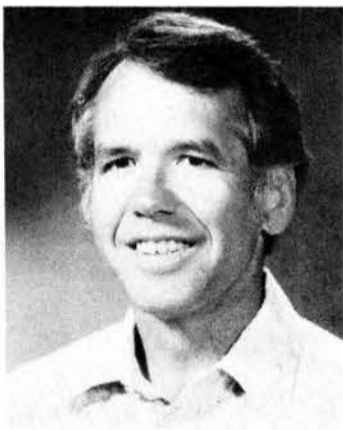
Gene Arndt (7171) 20



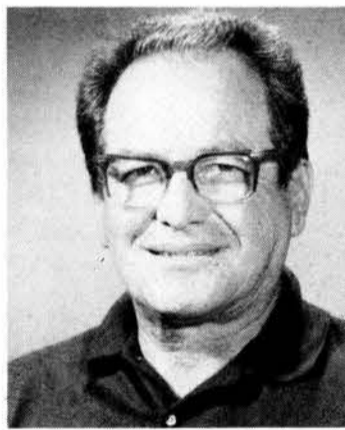
Bruce Van Domelen (2514) 25



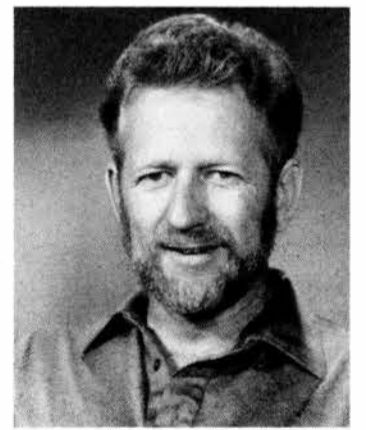
Richard Curlee (7471) 25



Keith Johnstone (331) 15



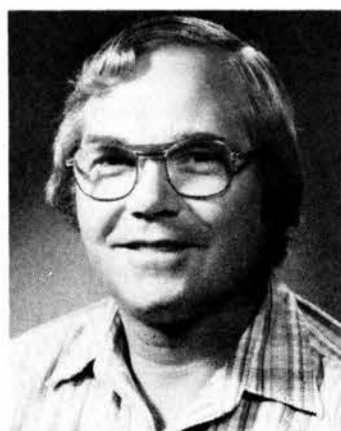
Vic John (7471) 35



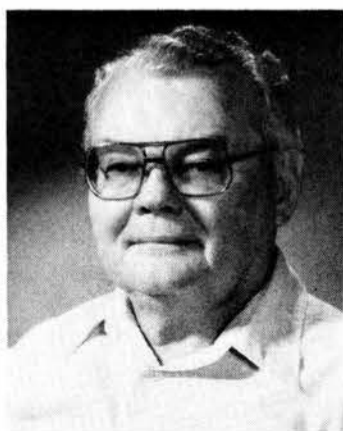
Ed Shoaf (5252) 20



Jim Carmody (7474) 30



Jeff Tingley (2565) 15



John Logan (3422) 35



Eddie Torres (7818) 15

**Deadline: Friday noon before week of publication unless changed by holiday. Mail to: Div. 3162.**

**Ad Rules**

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8½ by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per issue per category.
8. No more than two insertions of same ad.
9. No "For Rent" ads except for employees on temporary assignments.
10. No commercial ads.
11. For active and retired Sandians and DOE employees only.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.

**MISCELLANEOUS**

FOUR 33x12.5x15 B.F. Goodrich All Terrain tires on 10x15 chrome spoke rims, \$225 for all. Nelson, 881-0148.

BABY ITEMS: swing, chair, bath, car seat, stepstool. Kramer, 262-1040.

CARPET, 15x15 w/pad, tan & white, med. shag, \$50; antique hutch, beveled mirror, glass doors, claw feet, \$125. Bundy, 821-1846.

METAL CABINET, harvest wheat, 30"Dx16"Wx36"T, 1 drawer, \$55 cash. Schroer, 823-2831.

HONEYWELL Slave strobron studio strobes, 2 ea., \$100 OBO, other gear for sale. Bailey, 268-8079.

TWO Bell full-face helmets w/visors, half price. Johnson, 266-0513.

DISHWASHER, Modern Maid, under-counter, needs work; Norge Never-D-Frost refrigerator, needs cold control switch, \$100 for both. Abeyta, 298-4276.

UTILITY TRAILER, light weight, metal box 5' x 7', \$175; 3 tires 195-70R13. Bray, 292-2410.

ADDING machine, 9-key, Ohdner. Kerns, 821-4122.

PIANO, Grand, 4 yrs. old, paid \$1500, sell \$700. Chavez, 296-3160.

CHROME/glass table, round, 36" dia. w/2 white vinyl/chrome director's chairs, \$100; matching lamp, \$30. Schkade, 292-5126.

COUCH, 4 chairs, dinette/4 chairs; knitting machine & yarn; Avon. Cooper, 884-2814.

RADIO SHACK TRS80 model 4P computer, fully expanded system, printer, 2 disks, 128K memory, modem, 640x240 graphics, CP/M plus, lots of software. Cummings, 266-2689.

VIOLIN, Suzuki, ¾ student size, new \$315, sell \$225; Kenmore gas dryer, white, \$125. Sanders, 298-4194.

APPLE IIE system & software, dual drives, monitor, 128K, Okidata printer, 1 yr. old, \$2800 value, sell \$1400. Dionne, 883-7544.

BATHTUB, used, cast iron, built-in type w/white enamel finish, make offer. Klarer, 344-0612.

FREE bag of cat food & kitty litter w/each fuzzy kitten you adopt, will deliver. Zuchowski, 281-5678.

GOLD refrigerator; white washer; white dryer, \$100 each; 10" radial arm saw, \$150. Murphy, 821-7785.

D-41 Martin guitar w/hard case, left handed, \$1400. Perryman, 281-3020.

SPEAKERS, Infinity Qa w/stands, turntable Denon DP 11Fw/microacoustics 300Z cartridge, \$165 each. Hsing, 293-5670.

OSTER kitchen center, blends, mixes, grinds, shreds, new \$169, sell \$100. Miller, 268-5992.

HORSES: Pinto Arab filly, dbl. reg., bay half Arab filly, good conformation, halter broke & gentle. Jones, 281-3617 after 6.

MISC. furniture & appliances, 2 accordians, transmission stand,

amplifier. Hill, 294-7534, 883-3712.

ENGINE, Olds 455 w/turbo hydromatic trans. attached & all accessories, 62K miles, best offer. Bullock, 299-2473.

CHASSIS/electrical & body G.M./Helms manuals for '78 Oldsmobiles, \$15 for both. Burkhardt, 256-3310.

FREE, old storm windows & screens. Worth, 299-1032.

WHIRLPOOL apt.-size elec. dryer, \$150 OBO; infant high chair, \$20 OBO. Owen, 299-3487.

1980 White Gibson doubleneck 6/12, w/case, \$950. Ortiz, 831-0274.

DINING TABLE, 31"x51", smoked glass top, chrome legs, \$75. Lehrer, 831-4360.

HANGING Fireplace, ski lodge style, 360 degree screen, 37-inch dia., 57-inch HT, black, 4 suspension chains, \$250 OBO. Talbert, 298-9036.

TENT trailer, Coleman, sleeps 6, new tires, many extras, \$2500. Gray, 897-0525.

10 GAL. aquarium, pump, heater, filter, thermometer, gravel, plants, etc., some fish, \$18. Mowrer, 281-5595.

BUNK BEDS, youth size, complete, \$50; viola, Roth intermediate, w/hard case & music stand, \$250 OBO. Letz, 293-4525.

CERAMIC kiln, make offer. Hunter, 865-5745.

RIMS for Chevy & Ford, \$15; clothesline, \$15; tires, 195 70 HR14, \$10; cast iron lavatory, \$10. Padilla, 877-2116.

TRS 80 MOD III computer w/tape recorder & dot printer, \$500. Henry, 266-6467.

TWO water heaters, natural gas, new, in crates, 30-gal., \$75; 20-gal. \$50. Guttman, 243-6393.

TENT trailer, pop-up, sleeps 6, furnace, battery w/charger, kitchen slides out for outside cooking, \$1300 OBO. Welch, 266-2074.

ANTIQUA upright piano, walnut burl, \$800 OBO; '69 Les Paul custom, \$750 OBO; Epiphone archtop, \$750 OBO. Diaz, 292-1450.

AKC Silky Terrier, small dogs, 9 weeks, 2 males, \$300; 1 tiny female, \$400, cash. Debaca, 898-5356.

SINGLE waterbed, heater, frame, liner, headboard, \$70 OBO. Drebing, 266-6688 after 6.

BUNDY student flute, \$80; Normandie student clarinet, \$100, both have cases. Glor, 881-3157.

WATERBED mattress, king size, heater w/controls & liner, \$65. Miller, 296-4531 after 6.

'75 KONFORT travel trailer, 20' long, self contained, \$4500. Campbell, 888-3135.

BABY ITEMS: crib, high chair, dbl. stroller, 2 ea. strollers, bike seats, backpacks, potties, booster seats, clothes, toys, misc. Aug. 24, 25, 1920 Paige NE. Boyes, 296-0654.

SEWING machine by Brother, in cabinet w/attachments & manuals, used once, \$275. Laird, 292-4215.

IBM PC system unit w/keyboard, 2 disk drives, 256 Kb RAM, IBM monochrome display, Itoh printer. Rieger, 831-0407.

SOFA w/chair, \$75; dining table w/6 chairs, \$80; queen bed, \$50; washer/dryer, \$75; garage sale, Aug. 17, 12205 Menaul. Trellue, 293-0923.

SOLAR blanket, new, 15' diam., \$20. Kerschen, 821-2848.

REECES trailer equalizer bar hitch; 1 captain's chair for van, reclines & swivels, w/armrests. Gabaldon, 864-7175.

4 BLACK wrought iron patio chairs, made in Mexico, \$40. Resnick, 292-3825.

MOTORCYCLE/utility flatbed trailer, reg. HD tilt-bed, new 15" tires, lights & tiedown chains, \$100. Barnard, 831-4114.

STARCRAFT pop-up camp trailer, sleeps 6, furnace, wardrobe, new tires. Hoover, 821-0341.

TENT trailer, Apache Falcon, 2 dbl. beds, can be towed by small cars, signal lights, tongue jack, \$800. Brion, 298-1761.

GARAGE SALE, Aug. 17: guns, tools, motorcycle, stereo, furniture, clothes, misc. items. Ortiz, 3224 21st Ave., Rio Rancho, 892-9433.

5-STRING leda banjo, \$275 OBO; Cuisinart pasta attachment, fits DLC-7 Super Pro, \$75. Seager, 299-4137.

REFRIGERATOR/freezer, 22 cu. ft., side-by-side, w/ice maker, \$225 OBO. Gwinn, 299-7167.

16' ARISTOCRAT Land Commander travel trailer, gas refrig.-stove-oven-heater, monomatic toilet, \$2K; Frigidaire cyla-matic refrigerator/freezer, white, \$75. Flanigan, 299-0049.

GOLD shag carpeting, 11'x12', \$35; 10' aluminum John-boat w/oars, life jackets, \$150. Klocinski, 888-0554.

UTILITY TRAILER, bed 50x78 inches, w/rack, rugged, \$175. Harner, 281-1735.

INSULATED pickup shell w/boat rack, fits LWB, \$75 OBO; four 7:50-16 truck tires, 8-ply, mounted on Ford 8-lug rims, \$100 OBO. Sidlauskas, 881-2562 after 5.

VIOLA, Roth, 13", w/case & accessories, \$225 OBO; used lumber, many types. Westfall, 884-8701.

PINK Holly Hobbie twin bedspread; 5 yds. matching fabric, still on bolt, 100% cotton. O'Bryant, 268-9049.

8' SLIDE-IN camper, cabover bunk, stove, heater, icebox, jacks, tie downs, chem. toilet, \$1100. Key, 298-7988.

**TRANSPORTATION**

MOTO GUZZI 1000cc convert., new tires, flywheel, drive shaft, etc.; 18K miles, \$2500 OBO. Bailey, 268-8079.

'73 FORD Torino, 4-dr., full power, AC, orig. owner, \$600 OBO. Mortley, 299-1706.

HONDA Big Red 3-wheeler, loaded, take over payments \$17/week or \$1800. Johnson, 266-0513.

'77 CAMARO, 6 cyl., AC, 60K miles, new upholstery, \$2600. Zamora, 294-3737.

'81 DATSUN 4 x 4, king cab pickup, 5-spd., AC, PS, stereo, camper shell, 6 snow tires, \$4995. Carter, 898-3425.

'80 CITATION, 4-cyl., 2-dr., 53K miles, PS, PB, AC, \$2500. Schmitt, 884-7882.

'78 CHEVY Nova, 2-dr., AT, AC, PB, PS, \$1600 OBO. Torres, 299-5789.

'77 PLYMOUTH Volare sedan, low miles, records, AC, CC, PS, PB, vinyl roof, \$1500 OBO. Blaydes, 213A Charleston NE.

'70 VW bug, engine needs work, \$900. Arning, 256-9229.

'68 FIAT 850 Spider, needs work, \$500. Chavez, 296-3160.

'79 MONTE CARLO Landau, V8, AT, AC, PS, PB, CC, AM/FM tape, one owner, 51K miles. Dressendorfer, 292-5965.

'80 AMC Spirit, 2-dr., LB, \$2000. Charlton, 1-471-2688.

BICYCLE, 3-spd., mens, 21" Sears, fenders, chainguard, kickstand, rear baskets, \$45 OBO. Joseph, 299-6989.

'70 DATSUN 2000 Roadster, 5-spd., new interior, hard top, 4K miles on engine & trans., rebuilt front end, \$2500. Kass, 268-5922.

'74 HONDA dirt bike, CR125 w/new trailer, \$500. Riley, 293-5868.

'71 VW camper, \$1900; '72 Datsun pickup, \$1300, trade for whatever. Roeschke, 298-0365.

SCHWINN LeTour 10-spd., 26", 27" frame; '82 Kawasaki GPZ 750, low miles. Georg, 266-3203.

'79 HONDA CM-4000T, 7K miles, kept in garage, windshield, crash bars, pegs & cruise control, \$875. Perryman, 281-3020.

TOYOTA mini-motorhome, sleeps 4, \$5000. Bazar, 898-1467.

'77 OMEGA Olds, charcoal on grey, V8, AT, PB, PS, recent tune-up, new: battery, belts, tires; 72K miles, \$2K. Marchi, 299-8516.

'69 INTERNATIONAL Crew cab, AT, runs but needs some work. Caton, 293-9584.

'84 HONDA Accord, AT, factory air, less than 3K miles, \$8995 OBO. Gonzales, 821-6882.

'74 VOLVO 4-dr., \$1500. Stromberg, 255-6131.

'67 FORD ¾-ton pickup, \$550; '65 VW bug, \$325; '80 Ford Fiesta, \$1200. Montoya, 243-5868.

SIDECAR, Equalean, w/mounting hardware for '75-79 Honda Goldwing,

\$1200; will consider sale of '78 GL1000 w/deal. Johnston, 294-4574.

BICYCLE, girls 24", 3-spd., \$50. Letz, 293-4525.

'75 RABBIT, 4-dr., one owner, \$1500. Renken 296-9713 after 8/18 & 6 p.m.

'64 GTO, orig. owner, 2-dr., 4-spd., best offer over \$5K. Garrison, 881-1851.

'76 FIAT Model 128, 4-dr. sedan, 60K miles, AM/FM radio, \$700. Randoour, 298-5684.

'75 CHEVY Nova, AC, PB, PS, 58K miles, new brakes, \$1500. Russo, 293-0315.

'77 MONTE CARLO, 2-dr., new engine-trans.-brakes, AT, \$2200; '76 Monza 2-dr. std., 4-spd., new motor, clutch. Ellison, 892-3662.

'77 JEEP CJ7 hardtop, new paint, \$3K OBO; '79 Porsche 924, 5-spd., \$7K OBO. Bayless, 281-9197.

'75 CHEVROLET Impala, 2-dr. HT w/AC, PS, PB, CC, \$1800. Chavez, 345-5471.

'84 HONDA XR-500, less than 300 miles, \$1700. Dosch, 299-2557.

'74 BUICK 4-dr., \$500; gas go-cart, new. Campbell, 888-3135.

'82 TOYOTA Tercel, 4-dr., AC, 19K miles, 5-spd., AM/FM/cassette, \$4200. Newcom, 293-5180.

'74 HONDA Trail 90, 3600 miles, bumper carriers, first \$400 takes it. Ford, 294-6133 after 5.

'75 DATSUN B210, 54K miles, AT, \$995. Vickaryous, 897-7416.

'71 VW bug, 65K miles, damaged rear fender. Morgan, 299-7040.

'71 PONTIAC, 455 V8, new AC, AT, PS, PB, hitch receiver, air shocks, outfitted for towing, \$1100. Barnett, 281-2154.

'70 Z-28 Camaro, 4-spd., PS, 12-bolt Posi-Trac, rear-end spoilers, American racing mags, \$1700. Gonzales, 265-2671 after 4.

'75 DATSUN B210, \$1500. Nee, 266-4278.

'75 VW bus, \$2500 or trade for tractor or travel trailer. Lente, 869-2958.

'73 CAD, Sedan DeVille, loaded, reg. gas, one owner, 79K miles, maintenance records available, \$1700. Crawford, 299-0260.

HONDA 750, matching windjammer fairing, luggage rack, header, new tires, \$850. House, 293-6016.

'76 CORDOBA, 76K miles, AC, all power options, 440 CDI, \$1500. Duus, 296-0882.

'77 FORD pickup, F150, 4-wd, 4-spd., lg. tires, 12½x33, dual tanks, AM/FM cassette, \$2900. Kocinski, 888-0554.

'82 MAZDA RX7-GSL, leather interior, AC, all options, 21K miles, NADA \$9875 without leather, sell \$9500. Dippold, 821-5750.

'74 CHEV. C-10 pickup, LWB, 350, AT, PS, PB, AC, chrome wheels, stereo, \$2500 OBO. Powell, 821-0012.

'78 SUBARU 4-wd wgn., 4-dr., 4-spd., 74K miles, ski rack, AM/FM cassette. Ritchey, 268-7620.

'79 CHEV. Impala stn. wgn, 350V8, AT, PS, PB, AC, AM/FM, 3 seats, new windshield, \$2400 OBO. Bailey, 897-4740.

**REAL ESTATE**

TRILEVEL, 2330 sq. ft., huge corner lot w/RV access, 3-bdr., 2½ bath, lg. den w/volcanic rock fp. Buenos Aires NW, \$104K. Skogmo, 898-6013.

EDGEWOOD, 27 acres, all fronts highway 66 south side, 2 blocks east Post Office, \$8K/acre, 20% down. Lewing, Box 1731, Sun City, Ariz., 85372.

NE Hts., 1440 sq. ft., LR/DR, 3-bdr., 1½ bath, fp, fruit trees, assume FHA at 9½% w/payments of \$482. Hernandez, 881-6485.

PARKLAND Hills/Ridgecrest area, 2300 sq. ft., hw floors, 2¼ bath, 3-bdr., study, atrium, darkroom, open floor plan, \$122.5K. Strip, 255-7230.

NEAR Navaho Dam on San Juan River, 2.3 acres, 12x65' MH, power on property, fenced, irrigation rights. Caldwell, 299-6480.

NEAR Tierra Amarilla, Heron Lake, 10.8 acres of panoramic views, including El Vado Lake, San Juan Mtns., \$33K. Dressendorfer, 292-5965.

3-BDR., 1½ bath, NE Hts., landscaped,

atrium, approx. 1400 sq. ft. Bergeron, 292-7490.

0.5 WOODED ACRES, Manzano Mtns., near Torreon, Sherwood Forest Development, water & electricity nearby, \$3K. Mueller, 281-1766.

'81 REDMAN Las Brisas MH, 70x14, 2-bath, 2-bdr., in park near base, \$19,500. Burkinshaw, 293-7563.

162 ACRES, mostly wooded, on paved road w/electricity, water, phone, near Ocate, NM, 25 miles from Angel Fire. Letz, 293-4525.

3-BDR., 1½ bath on Hendrix near Carlisle & Hwy. 25, \$60K, \$20K firm, owner will carry balance. Hill, 294-7534.

'82 AMERICAN Eagle MH, 2-bdr., 2 bath, appliances, set up in NE family park. Eberhart, 821-0536.

CORRALES custom adobe, 2600 sq. ft., 1.44 acres, brick floors, beamed ceilings, 2 fps, pool, tennis court, room for horses, views. Schindwolf, 897-0470.

HEIGHTS adobe, 2500 sq. ft., brick floors, beamed ceilings, 4-bdr., 3-bath, \$129,500 w/\$31K mortgage assumable at 7½%. Bateman, 255-5375.

LEVEL one-acre lot in Manzano View Estates, Los Lunas, restricted, horses OK, underground utilities, cash \$15,950. Wallace, 898-4989.

COLORADO resort property, near skiing, fishing, boating, hunting; ½ acre wooded lot. Smith, 268-8086, 265-4734.

2 ACRES in Valencia, \$33K. Carabajal, 869-2855, 869-3656.

3-BDR. TH, 2-car garage w/opener, fenced yard, landscaped, no assn. fee, 7¼ assumable mortgage, near KAFB. Jones, 296-7860.

CABIN, 3 3/8 acres at El Vado overlooking lake, 2-bdr., full bath, kitchen, den, fp, paneled, garage, \$35,500. Rael, 884-4778.

MH, 3-bdr., 2 bath, lg. kitchen, lg. carport, many extras, Aztec MHP, dbl-wide, \$19,500. Chavez, 298-0674.

3-BDR., 1½ bath, active/passive solar, landscaped, near Eisenhower. Davis, 294-7478.

3-BDR., 2½ bath, 1500 sq. ft., Los Lunas, \$67K. Hunter, 865-5745.

3-BDR., 1½ bath, over 1500 sq. ft., solar, wood-burning stove, patio, ½ acre, energy efficient, \$66K. Ortiz, 892-9433.

FOUR-PLEX, Lomas/Chelwood area, 2-bdr. units w/refrig., dishwasher, disposal; laundry room, parking, \$149K, assumable REC. Harrington, 294-6368.

**WANTED**

FOUR- or five-foot chain link fencing, 500'. Hansen, 869-2716.

COBRA 72 Express Soccer team is recruiting experienced players. Call Chip Mansure, 821-4898.

FEMALE ROOMMATE, share new MH, base area, own bdr. & bath, all appliances, \$235/mo. + utilities. Lambert, 892-0541.

USED IBM PC or Macintosh, used VCR. Campbell, 294-1380.

HOUSEMATE, country living, Sandia Park area, own bedroom, bath, \$225/mo., utilities paid, prefer female, non-smoker. Swanson, 281-2735.

SAFETY pilot for IFB proficiency flights, willing to trade time. Jones, 298-2067.

WEIGHT lifting set, w/ or wo/bench, for young adult. O'Bryant, 268-9049.

CINDER BLOCKS new or clean used, 8x8x16 or 6x8x16. Talbert, 298-9036.

OLYMPUS camera body, OM1, 2, 4, G or 10, good condition. Young, 884-7836.

'72 or earlier, Honda 750, must be in good mechanical condition w/no accessories, will pay cash. Barnard, 831-4114.

**WORK WANTED**

HS sophomore desires babysitting, anytime except days during school. Sanders, 298-4194.

**SHARE-A-RIDE**

NEED 10 people or more to ride on new vanpool from the Belen/Los Lunas/Isleta area. Silva, 865-4752.

**LOST AND FOUND**

LOST — Gold necklace (cross in oval) within vicinity of Bldg. 880 or 828, reward. Peck, 844-4060.

## Two-for-One Specials Continue

TONIGHT, Enchantment is on the bandstand while in the dining room two-for-one prime rib or scallops are on special — two dinners for \$12.95. Call 265-6791 right now about reservations.

TEENAGERS dance at the Club next week, Tuesday, Aug. 20, starting at 7:30 in the pool and patio area. Dunn's Dancing Machine provides entertainment. It's the last teen dance at the Club for the summer.

SINGLES mingle on Thursday, Aug. 22, starting at 5 p.m. in the ballroom. Special drink prices (50-cent beer and margaritas) will be offered along with a free spread of munchies. The word is getting around: the Coronado Club is where it's happening.

NEXT FRIDAY, Aug. 23, the Isleta Poor Boys return to the Club bandstand. The two-for-one dining room special is your choice of filet mignon or fried shrimp for \$12.95.

THE THUNDERBIRDS retiree group holds a dinner dance on the patio on Tuesday, Aug. 27, starting with cocktails at 5:30 p.m. Dinner is your choice of barbecued chicken or beef for \$5.95. Bob Banks and the Trio play for dancing. Call 265-6791 soon for reservations.

A FINANCIAL SEMINAR on financial planning for retirement is scheduled Wednesday, Aug. 28, at 5 p.m. in Rm. B-5. The group that attended the one held earlier this month reports that the discussions on how to handle rollover options, income averaging, and IRS considerations were very helpful. Speaker will be Steve Stubbs of Dean Witter Reynolds, Inc. There is no admission charge.

THE CORONADO CLUB 6th ANNUAL 'FUN' GOLF tournament is set for Friday, Aug. 30, starting at 11:30 a.m. at Tijeras Arroyo golf course. This is the one where standard rules don't apply. On a couple of holes you use a baseball bat or a golf tee. Novices are welcome (and usually do very well). There's a party in the El Dorado room after all this nonsense, and prizes are awarded. Chet Fornero and Jim Davis (both retired) are co-chairmen. Pay the \$5 entry fee and pick up a copy of the rules at the Club office.

MAKE PLANS NOW to be at the Club on Friday evening, Aug. 30. Don Lesmen's big 11-piece orchestra plays melodies and arrangements from the big band era. The last time Lesmen was at the Club, the place was packed. Early reservations (call 265-6791) are a good idea. The dining room will feature another two-for-one special that evening — either poached halibut or prime rib for \$12.95.

RETIRING SOON? To honor the batch of Sandians planning retirement Sept. 30, the Club offers a "Bon Voyage" party on Sunday, Sept. 29. Retirees and those who



RETIRING at the end of September are (front row, from left) Joe Sanchez (7472), Catherine Devarenne (154), James Carmody III (7474), and Eddie Rael (7482). In the top row are Bob Lucas (2541), David Salas (2601), Bob Hawk (2833), and Bob Fueger (3436).

wish them well are cordially invited to celebrate the occasion. A super buffet will be spread, Don Lesmen's big band (with trumpets, trombones, and saxophones) will play for dancing, and Happy Hour prices will be in effect all evening. Cocktail hour starts at 5, dinner at 6, and music at 7. Cost is \$5.75 per person. The Club's office staff will make special seating arrangements available and reserve any size table. Call 265-6791 soon to nail down your party.

JUNIOR BOWLERS, A Club-sponsored group of youngsters age 7 through 17, bowl Saturdays at 9 a.m. at Holiday Bowl. The group seeks new members. League play starts Sept. 7. For details, call Cis Kelly (ret.), 255-8011.

TRAVEL DIRECTOR Marv Plugge (5171) announces a new charter bus trip to Havasu City-Laughlin, Nev., Oct. 12-15. The tour will join Havasu City's Anniversary Days celebration and dance under London Bridge. The package includes a three-and-a-half hour waterjet boat trip from Havasu to Laughlin where lodging at the new Sam's Town Casino is part of the package. Refreshments on the bus are also included. Cost is \$160 double occupancy. The Club office has details and handles sign-ups.

Another Coronado Club special trip is the Cumbres-Toltec railway excursion set Sept. 28. This one is different from the standard Cumbres-Toltec excursion in that arrangements are made to take the group on the entire route from Antonito to Chama through some of the most spectacular scenery in

North America. (Most tours stop and turn around at mid-point.) Snacks and refreshments are part of the package. Cost is \$45 for adults, \$33 for children 12 and under. Sign up at the Club office.

Another family outing offered is a weekend bus trip to Canyon De Chelly on Oct. 26-27. The package includes a continental breakfast, refreshments, a picnic lunch, a jeep tour of the canyon floor, and lodging at Thunderbird lodge. Price is \$90 double occupancy.

Check the literature at the Club office that describes a tour of the North Shore of Lake Superior and Canadian Boundary waters Oct. 4-13. It's an exceptional bargain at \$690 for air fare, charter bus, nine nights' lodging, and fantastic sightseeing.

### Welcome

#### Albuquerque

Greg Earnest (7813)  
Dana Flowers (3426)  
Dorothy Martin (3426)  
Kenneth Miles (3441)  
Bradley Nation (3426)

#### California

Alan Sylwester (1811)

#### Michigan

Paul Eichel (315)

#### New Mexico

Virginia Lujan (3426)  
Charlotte Smith (3426)

#### Texas

John Herzer (2629)  
John White (1622)